CSC6013 - Worksheet for Week 6

Russian Peasants Multiplication

1. Trace the Russian Peasants Multiplication algorithm for the following products.

Show each recursive call and the final result, as shown in the live session (table).

* 1. 64 \* 13
  2. 60 \* 13
  3. 59 \* 13

**Problem A - 64 \* 13**

|  |  |  |
| --- | --- | --- |
| **n** | **m** | **Steps** |
| 64 | 13 | 64 is even |
| 32 | 26 | 32 is even |
| 16 | 52 | 16 is even |
| 8 | 104 | 8 is even |
| 4 | 208 | 4 is even |
| 2 | 416 | 2 is even |
| 1 | 832 | **832** |

**Problem B - 60 \* 13**

|  |  |  |
| --- | --- | --- |
| **n** | **m** | **Steps** |
| 60 | 13 | 60 is even |
| 30 | 26 | 30 is even |
| 15 | 52 | 15 is odd (+52) |
| 7 | 104 | 7 is odd (+104) |
| 3 | 208 | 3 is odd (+208) |
| 1 | 416 | 416+52+104+208 = **780** |

**Problem c - 59 \* 13**

|  |  |  |
| --- | --- | --- |
| **n** | **m** | **Steps** |
| 59 | 13 | 59 is odd (+13) |
| 29 | 26 | 29 is odd (+26) |
| 14 | 52 | 14 is even |
| 7 | 104 | 7 is odd (+104) |
| 3 | 208 | 3 is odd (+208) |
| 1 | 416 | 416+13+26+104+208 = **767** |

Lomuto partition

1. Trace the Lomuto partition with the array:
   1. A = [100, 33, 22, 213, 65, 29, 153, 199, 47, 181, 85]

Using A[10] = 85 as pivot the final array will be:

● A = [33, 22, 65, 29, 47, 85, 153, 199, 100, 181, 213]

In your trace, write down to each change in either ***i*** or ***j***, stating: the values of ***i*** and ***j***, swaps made, and elements divided into lesser than the pivot, greater than the pivot, and yet to compare.

A screenshot of a computer program

Description automatically generated

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Description automatically generated